Newport Restoration Advisory Board
Project Committee Report
March 19,2003

This month's dredging project topic concerns "Beneficial Uses of Dredged Material", which is good news for a nation that dredges several hundred million cubic yards of sediment to maintain and improve harbors and waterways.

Prior to 1970, "dredge and dispose" was the method for most dredging projects. New science and public awarenness have created a beneficial use for dredge materials. These uses are classified as engineered uses, agricultural and product uses, and environmental enhancement.

A beneficial use of dredged materials creates economical and social benefits as well as lessening the need for the amount of material to be disposed.

It is important for restoration boards to be aware of the creative ways of using dredged material to benefit rather than to destroy our environments.

Respectfully submitted by:

Emmet E Turley

Emmet Turley, Chairperson

Enclosure (4)

Beneficial Uses Of Dredged Material

Definition: Utilizing dredged sediments as resource materials in productive ways.

Introduction: Several hundred million cubic yards of sediment must be dredged from United States ports, harbors, and waterways each year to maintain and improve the nation's navigation system for commercial, national defense, and recreational purposes. Traditional dredging methods discharge sediment into confined disposal facilities or waters of oceans, rivers, lakes, wetlands, and estuaries. Dredged material containment facilities currently in use in the United States are nearing or are already full to capacity with material. Identifying new containment sites poses difficulties due to conflicting land uses, potential environmental impacts, and high value of near-water real estate.

Due to growing scientific knowledge and public awareness of using dredged material as a valuable resource, beneficial use of dredged material has become a viable option to traditional "dredge and dispose" methods for many projects. Prior to 1970, beneficial uses of dredged material were primarily to build or expand land for airports, ports, residential, or commercial development. Dredged material is now used beneficially for many more projects and purposes.

Beneficial uses of dredged material have been classified, for the purpose of these discussions, into three broad categories: engineered uses, agricultural and product uses, and environmental enhancement. Specific beneficial use examples are listed for each category and case study projects are provided. Some beneficial uses could have been placed into more than one category. For example, beach nourishment is placed under engineered uses, although it also enhances the environment.

The composition and grain size distribution of dredged material is important in matching the material with the intended beneficial use. For simplification, dredged material is characterized as one of five sediment types: rock; gravel and sand; consolidated clay; silt/soft clay; and mixture (rock/sand/silt/soft clay). Numerous other factors must be evaluated when considering beneficial use options for dredged materials such as: contaminant status of materials; site selection; technical feasibility; environmental acceptability; cost/benefit; and legal constraints.

The disposal of dredged material is managed and conducted by Federal, state, and local governments: private entities; and semi-private entities, such as port authorities. The U.S. Army Corps of Engineers issues permits for the disposal of dredged material, while the role of the U.S. Environmental Protection Agency is to provide oversight in the permitting process.

Beneficial uses of dredged material may make traditional disposal of dredged material unnecessary or at least reduce the level of disposal. Economic, social, and other benefits can be derived from the productive use of dredged material. However, monitoring of the dredged material placement sites is critical for measuring success. Continued development of applications to utilize dredged material for beneficial uses is necessary.

Regional Summary Links

Dredged Material Uses

Engineered uses
Engineered uses take advantage of the dredged material resource in construction for commercial, industrial, or institutional purposes. Generally, coarse materials, including sand and gravel, are more suitable for engineered uses than are finer materials, which include silts and clays. Engineered uses of dredged material will generally require that the dredged material be placed within the coastal or waterway margin, but occasionally dredged material may be transported inland. The range of engineering applications for dredged material is diverse, being limited only by the ingenuity of the designer. Examples of engineering applications for dredged materials include land creation, land improvement, berm creation, shore protection, replacement fill, beach nourishment, and capping.

Agricultural and Product Uses
Agricultural uses include beneficial uses such as topsoil and aquaculture in dredged material containment areas. Product uses of dredged material include a wide array of manufactured construction materials.

Environmental Enhancement
Dredged materials may be used for environmental enhancement of wetlands, fisheries, and other habitats for wildlife utilization. The technical considerations are relatively well established and straightforward; however, the steps for selecting the most appropriate uses and progressing through project execution and long-term management will differ for each habitat. Placement design must provide an acceptably stable deposit at appropriate elevations for desired plant and animal occupancy, with a compatible substrate suitably rich in nutrients. Consideration should also be given to the method of initial colonization of plants and to the need for a long-term management plan. Periodic field monitoring will be required to assure success and to guide management decisions.

Beneficial Uses of Dredged Material

Comments / Whom to contact
Updated: March 1, 2000

Benefits of Beneficial Uses of Dredged Material

Economic Benefits
The productive use of dredged material provides tangible and intangible benefits that enhance the environment, the local community, and society. Economic benefits can be seen in cost savings from more effective port and channel maintenance dredging and through using dredged material in other applications, such as construction. Long-range planning for dredged material disposal should consider future needs of the public and private sectors and what measures would result in the greatest economic benefit. Use of sand, gravel, or other scarce materials resulting from dredging can be anticipated and plans made accordingly. Beneficial uses may be incorporated in planning for public recreation uses, environmental enhancement, and beach and shore protection. Beneficial uses can result in commercial products and services that result in an increase in employment in the private sector.

Social Benefits
Social benefits are generally a direct consequence of the particular beneficial use adopted. The most tangible direct benefit enjoyed by the local community is financial. This may be in the form of reduced community costs for a construction project or increased community income through improved agriculture, fisheries, tourism, product manufacturing, or job creation. Improved beaches may also boost tourism.

Another important social benefit is improvements to the environment and recreational and sporting opportunities. The local landscape may be enhanced through changes in topography and introduction of new plant and wildlife species. Enhancements to sporting activities, such as fishing, swimming, surfing, sailing, water skiing, and wildlife observation, will usually result in a better quality of life.

Other Benefits
Engineered uses of dredged material may produce other benefits such as:

- More ecological management of natural resources by providing some raw materials without mining or excavating them.
- Reduction in land or sea areas disturbed by disposal operations.
- Most available and cheapest source of materials.
- An increase in diversity and quantity of plants and animals.

Agricultural and products uses of dredged material provide a major ecological advantage by reducing the areas needed for mining or excavating sand, clay, gravel, rocks, or topsoil.

Many environmental enhancements would never be executed if dredged material were not available. Financial, logistical, and resource material constraints would otherwise limit options.

Monitoring
Monitoring of dredged material placement sites is critical to the success of a project. Site requirements and the particular beneficial use must be considered in determining the most efficient and effective monitoring plan. A comprehensive monitoring plan should include: properly selected monitoring tools and study design; preplacement and postplacement data collection; and clearly defined success criteria. The sophistication of the monitoring program depends on the beneficial use and the environmental impact.

Monitoring usually takes two forms: physical and biological. Physical monitoring determines whether engineering integrity is maintained and will fall into two broad categories: the effect of the placement on the physical process at the site; and identifying potential environmental impacts through physical monitoring. Physical monitoring tools available include hydroacoustic surveys; sediment sampling; tide, current, and wave gauges; settling plates; seabed drifters; and aerial photography.

Biological monitoring involves measures of parameters that determine the effect of the beneficial use project on the environment. Generally soils (physical and chemical), water quality, benthos, fish, wildlife, and vegetation are monitored. Monitoring may be used to determine further action; for example, midcourse correction where a project is not achieving its goal or the need for additional dredged material placement. The time length and sampling interval of the plan will be determined by the long-term goals for the site and the environmental consequences of the placed material.

The Beneficial Use of Dredged Material Monitoring Program, established by the U.S. Army Corp Engineer District, New Orleans, provides monitoring case studies and discussions of methodologies.

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